ABSTRACT

Infectious disease epidemics have played and continue to play important roles in human populations. Observations of epidemic effects at the regional or global level might mask the important demographic, social, cultural and random factors that influence variation at the individual or community level. In small, traditional communities, these factors include patterns of settlement and organization, daily behaviors, and important relationships. This research applies two individual-based models to test the relative impact of these different factors on disease spread in a small study community in Newfoundland and Labrador in the early 20th century, using data from the 1918 flu pandemic.

In the agent-based model, which emphasizes mobility to important social spaces, schoolchildren drive the size and timing of epidemics. Conversely, in the social network model, which reflects important relationships among community residents, adult women frequently suppress disease spread, producing smaller and later epidemics than other demographic subgroups. These results demonstrate the importance of studying how individual behaviors and interactions influence larger epidemic patterns, and of selecting appropriate design features in models intended to increase knowledge of the system of disease spread and make public health recommendations.